

## Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

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## A. Defining ACOs

For each of the 146 ACOs entering contracts with Medicare in 2012 and each of the 105 MSSP ACOs entering contracts in 2013,<sup>1-4</sup> we matched names of participating physicians and provider groups posted by CMS or ACOs to national provider identifiers (NPIs) or tax identification numbers (TINs), using publicly accessible databases (95% of physician and group names were matched to an NPI or TIN).<sup>5-9</sup> Practices for which we could not find a TIN, or a roster of physicians to convert to NPIs, were generally small, as indicated, for example, by practice names that consisted of physician last names.

To limit misclassification due to physician turnover within constituent practices of ACOs over the study period, we defined each ACO as a collection of TINs by converting participating NPIs to the primary TINs under which they billed in 2011 claims. Specifically, for ACOs wholly or in part defined by posted lists of physicians (rather than lists of practice, provider group, or facility names), for each member physician we identified the TIN under which the physician's NPI billed the most primary care services (Current Procedural Terminology (CPT) codes 99201-99215, 99304-99318, 99324-99340, 99341-99350, G0402, G0438, G0439), using 2011 claims for a 20% random sample of traditional fee-for-service Medicare beneficiaries. Because some NPIs bill under multiple TINs (e.g., multiple practice locations) and because some physicians' practices may have changed between 2011 and the time at which ACOs submitted their lists of participating providers to CMS, we assessed the strength of association between an NPI's TIN and the NPI's ACO before classifying the entire TIN as part of the ACO. To do so for a given TIN, we calculated the total number of all NPIs (ACO members and non-members) billing primarily under that TIN and the number of ACO-affiliated NPIs billing primarily under that TIN. For TINs for which an ACO's member NPIs constituted <25% of all of the TIN's

billing NPIs, we looked up the name of each TIN and determined whether it was part of the ACO based on constituent practice information available on the ACO's website. For TINs for which an ACO's member NPIs constituted  $\geq 25\%$  of all the TIN's billing NPIs, we counted the TIN as part of the ACO because we determined that a high percentage of TINs meeting this criterion were indeed part of the ACO from applying a similar search procedure to a random sample of TINs whose ACO-affiliated NPI fraction fell between 25-59%. In total, the 251 ACOs comprised 12,261 distinct TINs.

Results were similar in a sensitivity analysis defining ACOs as groups of NPIs instead of groups of TINs to hold ACOs' physician composition constant over the study period (Tables S3-4). To define ACOs as groups of NPIs, for ACOs wholly or in part defined by posted lists of TIN names (practice, provider group, or facility names) rather than by lists of physician names, for each TIN included in an ACO, we included the NPIs billing primarily under that TIN (as described above) as part of the ACO. Compared to our main analyses using groups of TINs to define ACOs, in analyses using groups of NPIs to define ACOs, differences in response rates among beneficiaries assigned to ACOs vs. those assigned to other providers were even smaller in the pre-intervention (+0.2%) and post-intervention (+0.1%) periods (differential change just -0.1%). Because differential improvements in patient experiences, where present, were similar or slightly larger (Tables S3-S4), differential changes in response rates were therefore unlikely to explain our findings.

## **B. Assigning Beneficiaries to ACOs**

Following the MSSP rules,<sup>10</sup> we assigned each CAHPS respondent in each survey to the ACO or non-ACO TIN accounting for the most allowed charges for primary care services received by the respondent during the linked claims year. We used claims preceding rather than

during each survey period for two reasons: first, to better align assignments for the post-intervention period with lists of prospectively or preliminarily assigned beneficiaries supplied to ACOs by CMS to support population health management;<sup>10,11</sup> and second, to minimize potential bias from MSSP ACO incentives to attract healthier patients or code diagnoses more intensively (i.e., “upcode”) in the post-intervention period to achieve savings. For assignment, we did not count physician visits in nursing facilities as primary care services because the FFS CAHPS survey focuses on patient experiences in outpatient settings.<sup>12</sup>

### **C. Construction of Composite Scores**

We calculated composite scores for two domains—timely access to care and interactions with primary physician—because they are composed of closely related items, whereas items in the overall ratings and care coordination and management domains may cover more distinct constructs (e.g., ratings of care overall vs. ratings of physicians). To construct these composite scores, we first converted the 1-4 scale to a 0-10 scale ( $0-10\_score = 10 \times (1-4\_score - 1) / 3$ ). We then subtracted the grand mean score (i.e., among all respondents) for each item from each respondent’s score for that item. Subtracting the item-specific grand mean adjusted for compositional changes in the composite that could have otherwise influenced difference-in-difference estimates. Without this adjustment, for example, increases in non-response to lower rated items in the intervention group could have contributed to differential increases in composite scores. For each respondent, we then averaged scores across items to which the respondent responded and added the grand mean of the composite score to the respondent’s composite score to return estimates to a 0-10 scale.

### **D. Estimation of ACO-level Variation in Patient Experience Measures**

To facilitate interpretation, for each measure we calculated an effect size by dividing the differential change ( $\beta_3$ ) by the standard deviation (SD) of mean scores across ACOs, using linear mixed models to estimate ACO-level SDs. Specifically, among beneficiaries assigned to ACOs, we fitted linear models of scores for each measure as a function of beneficiaries' sociodemographic and clinical characteristics and random effects for the mean score in each ACO. SDs were then calculated for each measure from the estimated variance in ACO-level means.

We fitted similar models for the entire sample with HRR-level random effects to estimate regional variation in mean scores. ACO-level and HRR-level SDs were similar.

### **E. Model Specification for Pioneer vs. Medicare Shared Savings Program (MSSP) ACO Estimates**

To estimate differential changes separately for beneficiaries assigned to Pioneer and MSSP ACOs we modified our main model as follows:

$$E(\text{Score}_{i,t,k,h}) = \beta_1 \text{ACO\_indicators}_k + \beta_2 \text{Year\_indicators}_t + \beta_3 \text{Pioneer}_k \times \text{Post-intervention}_t + \beta_4 \text{MSSP}_k \times \text{Post-intervention}_t + \beta_5 \text{HRR\_indicators}_h + \beta_6 \text{HRR\_indicators}_h \times \text{Year\_indicators}_t + \beta_7 \text{Covariates}_i$$

Where “Pioneer” indicates assignment to a Pioneer ACO and “MSSP” indicates assignment to a MSSP ACO. To adjust for differences in pre-intervention trends, we then added interactions between the Pioneer and MSSP group indicators and year, specified as a continuous predictor.

### **F. Discussion of Table S2 Results (Stratification by Patient Complexity)**

Because the experiences of medically complex patients with high predicted utilization may be particularly affected by ACO efforts to improve quality and limit utilization, we stratified the study sample into beneficiaries with  $\geq 7$  CCW conditions and HCC scores of  $\geq 1.1$

(approximately 25% of beneficiaries) vs. other beneficiaries. Our goal in defining these strata was to identify a quartile of patients at highest risk for medical complications, unnecessary testing and procedures, and high Medicare spending, whom ACOs might focus on in their efforts to improve quality and limit spending. We used a combination of CCW condition counts and HCC scores to identify patients with multiple chronic conditions *and* higher predicted spending, in whom patient-specific investments by ACOs might yield returns in the form of shared savings bonuses.

In addition to differential changes in overall ratings of care being entirely concentrated among this subgroup of high-risk patients, differential changes in patients' ratings of their primary physician also appeared to be concentrated in this group but did not reach a  $P < 0.05$  threshold for statistical significance (Table S2). Although we did not expect substantial early effects of ACO contracts on physician ratings (and estimates were indeed close to zero in analysis of the full sample), it is possible that care management efforts focused on high-risk patients may have influenced their ratings of their primary physicians as well as of their care overall. The survey and claims data did not allow investigation of the reasons for this finding. Moreover, this finding was not robust to a sensitivity analysis defining ACOs as groups of NPIs (rather than groups of TINs); specifically, in Table S4, the differential improvements in ratings of primary physicians by medically complex patients in the intervention group are 50% smaller than the corresponding estimates in Table S2 and not statistically significant.

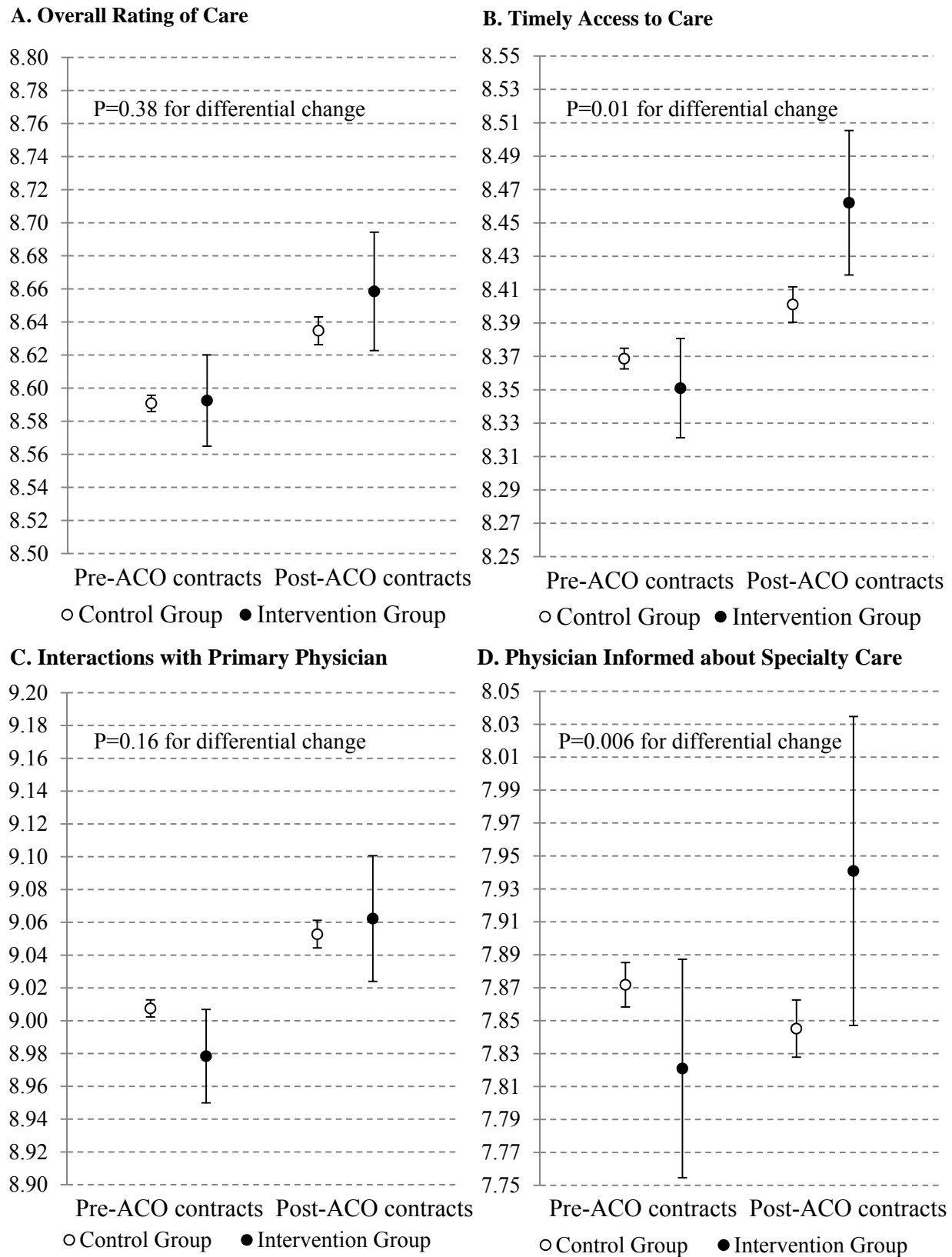
The differential change in ratings of interactions with primary physicians also may have been pronounced in the high-risk subgroup, but the significance of this finding was not robust to adjustment for group differences in pre-intervention trends (Table S2) or to defining ACOs as groups of NPIs (Table S4). Furthermore, in analyses of the individual items of this composite

(data not shown), we found that the composite effect in Table S2 (not adjusted for preceding trends) was largely driven by differential improvements in patients' ratings of the amount of time their primary physician spent with them. Differential changes were significant only for this item and not for ratings of physician communication, listening, and demonstration of respect.

Because the amount of time spent with a patient is determined not only by the physician but also plausibly by the physician's practice or ACO (as well as possibly by the patient's enrollment in an ACO's care management program), this result would be consistent with our stated hypotheses, though it was not statistically significant or robust to different assumptions about preceding trends and ACO definitions.

**FIGURE LEGEND****Figure S1. Patient experiences before and after the start of ACO contracts in 2012**

Mean patient ratings are displayed for the intervention group (beneficiaries assigned to provider organizations entering the Medicare ACO programs in 2012) and the control group (beneficiaries assigned to other providers) before and after the start of ACO contracts in 2012 for four measures of patient experiences: (A) overall rating of care; (B) timely access to care (composite measure); (C) interactions with primary physician (composite measure); and (D) primary physician informed about specialty care (a measure of care coordination). Significant differential improvements in the intervention group were observed in timely access to care and the likelihood of primary physicians being informed about specialty care, but not in overall ratings of care or interactions with primary physicians. Error bars indicate 95% confidence intervals.

**Figure S1. Patient experiences before and after the start of ACO contracts in 2012**

**Table S1. Characteristics of Intervention and Control Groups before and after the Start of ACO Contracts in 2012\***

	<b>Intervention Group</b> (assigned to an ACO) N=32,334		<b>Control Group</b> (not assigned to an ACO) N=251,593		<b>Differential change for intervention vs control group (95% CI)</b>	<b>p value</b>
	<b>Pre-intervention</b> 2010-2012 surveys N=21,463	<b>Post-intervention</b> 2013 survey N=10,871	<b>Pre-intervention</b> 2010-2012 surveys N=186,846	<b>Post-intervention</b> 2013 survey N=64,747		
Mean age, y	74.78±8.57	74.78±8.56	74.81±8.64	74.85±8.61	-0.04 (-0.27,0.19)	0.72
Female sex, %	54.1	55.5	53.3	55.4	-0.7 (-1.8,0.5)	0.26
Race/ethnicity, %						
White	85.9	86.8	86.2	87.3	-0.2 (-1.2,0.9)	0.74
Black	5.0	4.5	4.6	4.1	0.0 (-0.6,0.6)	0.94
Hispanic	2.2	2.3	2.4	2.5	0.0 (-0.5,0.5)	0.99
Other	6.9	6.4	6.8	6.1	0.2 (-0.6,1.0)	0.62
Education, %						
Some high school or less	11.2	9.9	12.0	11.2	-0.4 (-1.3,0.4)	0.33
High school degree	34.7	32.8	35.2	34.2	-0.9 (-2.1,0.3)	0.13
Some or 2-year college	28.0	28.3	27.2	27.1	0.3 (-1.1,1.7)	0.65
4-year college degree	11.0	12.3	10.5	11.2	0.6 (-0.4,1.6)	0.23
More than 4-year college degree	15.1	16.8	15.1	16.3	0.4 (-0.5,1.3)	0.35
Disabled, <sup>†</sup> %	8.4	8.3	8.6	8.6	0.0 (-0.8,0.8)	0.92
End-stage renal disease, %	0.4	0.5	0.3	0.5	-0.1 (-0.2,0.1)	0.48
CCW conditions <sup>‡</sup>						
Total no., mean	5.37±3.39	5.59±3.56	5.39±3.41	5.58±3.51	0.02 (-0.08,0.13)	0.66
≥6 conditions	47.4	49.6	47.5	49.7	-0.1 (-1.4,1.3)	0.92
≥9 conditions	18.1	20.9	18.3	20.5	0.6 (-0.5,1.8)	0.29
HCC risk score, mean	1.09±0.94	1.14±1.01	1.08±0.93	1.11±0.97	0.03 (0.00,0.05)	0.053
Proxy survey respondents, %	8.1	8.0	8.4	8.0	0.3 (-0.3,0.9)	0.28
Self-reported general health status (1-5), mean	3.05±0.98	3.08±1.00	3.04±0.99	3.08±1.01	-0.01 (-0.04,0.02)	0.41
Self-reported mental health status (1-5), mean	3.84±0.99	3.68±1.02	3.84±1.00	3.67±1.01	0.00 (-0.03,0.03)	0.99

ACO = Accountable Care Organization, CCW = Chronic Conditions Warehouse, HCC = Hierarchical Condition Categories

\*Means are reported  $\pm$  standard deviations. Means and percentages were adjusted for geography to reflect comparisons within hospital referral regions. Age, sex, race/ethnicity, disability, end-stage renal disease, CCW conditions, and HCC scores were assessed from Medicare enrollment and claims data. Education, general health status, mental health status, and whether a proxy responded on a beneficiary's behalf were assessed from CAHPS survey data.

<sup>†</sup>Indicates that disability was the original reason for Medicare eligibility.

<sup>‡</sup>Chronic conditions from the CCW include: acute myocardial infarction, Alzheimer's disease, Alzheimer's disease and related disorders or senile dementia, anemia, asthma, atrial fibrillation, benign prostatic hyperplasia, cataract, chronic kidney disease, chronic obstructive pulmonary disease, depression, diabetes, glaucoma, heart failure, hip/pelvic fracture, hyperlipidemia, hypertension, hypothyroidism, ischemic heart disease, osteoporosis, rheumatoid arthritis/osteoarthritis, stroke/transient ischemic attack, breast cancer, colorectal cancer, endometrial cancer, lung cancer, prostate cancer.

**Table S2. Differential Changes in Patient Experiences after Start of ACO Contracts in 2012 for Intervention vs. Control Group, Stratified by Patient Complexity**

Measure	Lower Complexity: HCC score <1.1 or <7 CCW conditions (N=220,994)				Higher Complexity: HCC score ≥1.1 and ≥7 CCW conditions (N=62,933)			
	Differential Change (95% CI) [Effect size*]	P Value	Differential Change Adjusted for Trend Differences in Pre-period <sup>†</sup> (95% CI) [Effect size*]	P Value	Differential Change (95% CI) [Effect size*]	P Value	Differential Change Adjusted for Trend Differences in Pre-period <sup>†</sup> (95% CI) [Effect size*]	P Value
<b>Overall Ratings (1-10)</b>								
Health care	0.00 (-0.05,0.04) [0.0]	0.84	0.02 (-0.06,0.10) [0.2]	0.65	0.11 <sup>‡</sup> (0.02,0.21) [0.9]	0.02	0.20 <sup>‡</sup> (0.06,0.35) [1.7]	0.005
Primary physician	-0.02 (-0.07,0.03) [-0.2]	0.42	-0.01 (-0.09,0.07) [-0.1]	0.75	0.08 (0.00,0.16) [0.8]	0.051	0.14 (0.00,0.29) [1.5]	0.052
Specialist	-0.01 (-0.06,0.04) [-0.1]	0.67	0.01 (-0.07,0.09) [0.1]	0.82	0.04 (-0.04,0.13) [0.5]	0.31	-0.03 (-0.17,0.11) [-0.3]	0.70
<b>Timely Access to Care (composite, 1-10)</b>	0.05 (-0.01,0.12) [0.9]	0.12	0.13 (-0.01,0.27) [2.0]	0.07	0.12 (0.01,0.22) [1.9]	0.03	0.13 (-0.06,0.32) [2.0]	0.19
<b>Interactions with Primary Physician (composite, 1-10)</b>	0.02 (-0.04,0.07) [0.2]	0.55	-0.03 (-0.12,0.06) [-0.2]	0.58	0.11 (0.02,0.20) [1.1]	0.02	0.10 (-0.07,0.27) [1.0]	0.23
<b>Care Coordination and Care Management</b>								
Primary physician informed about specialty care (1-10)	0.16 (0.04,0.28) [0.6]	0.01	0.24 (-0.04,0.53) [0.9]	0.09	0.09 (-0.09,0.27) [0.3]	0.33	0.48 (0.07,0.88) [1.7]	0.02
Patient care information available to primary physician (1-10)	-0.01 (-0.06,0.04) [-0.2]	0.66	NA	NA	0.01 (-0.08,0.10) [0.2]	0.80	NA	NA

Communication of test results (1-10)	0.02 (-0.07,0.12) [0.1]	0.64	NA	NA	0.00 (-0.21,0.20) [0.0]	0.98	NA	NA
Timely communication of test results (1-10)	0.04 (-0.03,0.12) [0.3]	0.24	NA	NA	0.05 (-0.10,0.20) [0.4]	0.48	NA	NA
Medication reconciliation (1-10)	-0.09 (-0.19,0.02) [-0.5]	0.12	NA	NA	0.03 (-0.16,0.22) [0.2]	0.77	NA	NA
Patient access to visit notes, %	0.02 (0.00,0.03) [0.1]	0.12	NA	NA	0.04 (0.01,0.07) [0.3]	0.01	NA	NA

ACO = Accountable Care Organization, HCC = Hierarchical Condition Categories, CCW = Chronic Conditions Warehouse, NA = not applicable (multiple years of data not available in pre-intervention period)

\*Effect sizes were calculated by dividing the differential change by the standard deviation of ACO-level means. Thus, an effect size of 1 could be interpreted as moving from average performance among ACOs to approximately the 84<sup>th</sup> percentile among ACOs.

†These differential changes were adjusted for any differences in trend between the intervention and control groups over the 2010-2012 surveys. Because most questions about care coordination and management were asked only in the 2012 and 2013 surveys, no adjustment for prior trends could be made (NA).

‡P=0.03 for difference between estimates for more vs. less medically complex patients.

**Table S3. Differential Changes in Patient Experiences after Start of ACO Contracts in 2012 for Intervention vs. Control Group (ACOs defined as groups of NPIs instead of TINs)\***

	Pre-Intervention Adjusted Means		Group Difference (95%CI)	Post Intervention Adjusted Means		Group Difference (95%CI)	Differential Change for Intervention Group (95%CI) [Effect size <sup>†</sup> ]	P Value	Differential Change Adjusted for Trend Differences in Pre-period <sup>‡</sup> (95%CI) [Effect size <sup>†</sup> ]	P Value
	Intervention Group	Control Group		Intervention Group	Control Group					
<b>Overall Ratings (1-10)</b>										
Health care	8.59	8.59	0.00 (-0.02,0.03)	8.64	8.67	0.04 (0.00,0.07)	0.03 (-0.01,0.07) [0.2]	0.15	0.08 (0.00,0.15) [0.6]	0.06
Primary Physician	9.04	9.05	0.01 (-0.02,0.04)	9.08	9.08	0.00 (-0.04,0.04)	-0.01 (-0.05,0.03) [-0.1]	0.69	0.00 (-0.07,0.06) [0.0]	0.95
Specialist	8.93	8.95	0.02 (-0.01,0.05)	8.97	8.96	-0.01 (-0.05,0.03)	-0.02 (-0.06,0.03) [-0.2]	0.41	-0.02 (-0.11,0.06) [-0.2]	0.57
<b>Timely Access to Care</b> (composite, 1-10)	8.37	8.36	-0.01 (-0.05,0.03)	8.40	8.48	0.08 (0.03,0.13)	0.08 (0.02,0.15) [1.0]	0.02	0.17 (0.05,0.28) [2.1]	0.004
<b>Interactions with Primary Physician</b> (composite, 1-10)	9.01	8.99	-0.02 (-0.05,0.01)	9.05	9.07	0.01 (-0.03,0.06)	0.03 (-0.03,0.08) [0.2]	0.32	0.01 (-0.07,0.09) [0.1]	0.78
<b>Care Coordination and Care Management</b>										
Primary physician informed about specialty care (1-10)	7.87	7.80	-0.07 (-0.15,0.00)	7.85	7.93	0.08 (-0.02,0.19)	0.16 (0.05,0.26) [0.6]	0.005	0.37 (0.14,0.61) [1.3]	0.002
Patient care information available to primary physician (1-10)	9.63	9.64	0.01 (-0.02,0.04)	9.63	9.64	0.01 (-0.02,0.04)	0.01 (-0.04,0.05) [0.1]	0.79	NA	NA
Communication of test results (1-10)	8.71	8.67	-0.03 (-0.11,0.04)	8.67	8.70	0.03 (-0.06,0.13)	0.08 (-0.01,0.17) [0.2]	0.09	NA	NA

Timely communication of test results (1-10)	9.07	9.04	-0.03 (-0.09,0.03)	9.08	9.11	0.03 (-0.04,0.09)	0.06 (-0.01,0.13) [0.4]	0.09	NA	NA
Medication reconciliation (1-10)	8.08	8.16	0.07 (-0.01,0.15)	8.10	8.12	0.02 (-0.05,0.09)	-0.06 (-0.16,0.03) [-0.4]	0.20	NA	NA
Patient access to visit notes, %	0.26	0.28	0.02 (0.01,0.04)	0.35	0.39	0.04 (0.02,0.07)	0.02 (0.00,0.04) [0.2]	0.02	NA	NA

ACO = Accountable Care Organization, NPI = national provider identifier, TIN = tax identification number, NA = not applicable (multiple years of data not available in pre-intervention period)

\*Differential changes may not equal differences between group differences because of rounding and slight differences in specification of models producing estimates of group differences and differential changes.

†Effect sizes were calculated by dividing the differential change by the standard deviation of ACO-level means. Thus, an effect size of 1 could be interpreted as moving from average performance among ACOs to approximately the 84<sup>th</sup> percentile among ACOs.

‡These differential changes were adjusted for any differences in trend between the intervention and control groups over the 2010-2012 surveys. Because most questions about care coordination and management were asked only in the 2012 and 2013 surveys, no adjustment for prior trends could be made (NA).

**Table S4. Differential Changes in Patient Experiences after Start of ACO Contracts in 2012 for Intervention vs. Control Group, Stratified by Patient Complexity (ACOs defined as groups of NPIs instead of TINs)**

	<b>Lower Complexity:</b> HCC score<1.1 or <7 CCW conditions (N=220944)				<b>Higher Complexity:</b> HCC score >=1.1 and >=7 CCW conditions (N=66925)			
	<b>Differential Change</b> (95%CI) [Effect size*]	<b>P Value</b>	<b>Differential Change Adjusted for Trend Differences in Pre-period<sup>†</sup></b> (95%CI) [Effect size*]	<b>P Value</b>	<b>Differential Change</b> (95%CI) [Effect size*]	<b>P Value</b>	<b>Differential Change Adjusted for Trend Differences in Pre-period<sup>†</sup></b> (95%CI) [Effect size*]	<b>P Value</b>
<b>Overall Ratings (1-10)</b>								
Health care	0.00 (-0.04,0.05) [0.0]	0.99	0.02 (-0.06,0.10) [0.2]	0.58	0.14 (0.05,0.23) [1.1]	0.002	0.24 (0.08,0.40) [1.9]	0.003
Primary Physician	-0.02 (-0.06,0.02) [-0.2]	0.38	-0.03 (-0.10,0.04) [-0.3]	0.46	0.04 (-0.04,0.13) [0.4]	0.32	0.07 (-0.08,0.23) [0.7]	0.33
Specialist	-0.04 (-0.09,0.01) [-0.4]	0.14	-0.04 (-0.13,0.05) [-0.4]	0.42	0.03 (-0.07,0.14) [0.3]	0.55	0.03 (-0.14,0.19) [0.2]	0.76
<b>Timely Access to Care (composite,1-10)</b>	0.07 (-0.01,0.15) [0.9]	0.08	0.17 (0.04,0.30) [2.1]	0.01	0.10 (-0.01,0.22) [1.3]	0.08	0.12 (-0.08,0.32) [1.5]	0.23
<b>Interactions with Primary Physician (composite,1-10)</b>	0.03 (-0.03,0.08) [0.2]	0.35	0.00 (-0.09,0.08) [0.0]	0.95	0.04 (-0.06,0.14) [0.4]	0.40	0.07 (-0.10,0.23) [0.6]	0.44
<b>Care Coordination and Care Management</b>								
Primary physician informed about specialty care (1-10)	0.19 (0.07,0.32) [0.7]	0.003	0.40 (0.11,0.69) [1.4]	0.01	0.06 (-0.14,0.26) [0.2]	0.55	0.39 (-0.04,0.83) [1.4]	0.08
Patient care information available to primary physician (1-10)	0.00 (-0.05,0.05) [0.0]	0.97	NA	NA	0.02 (-0.07,0.10) [0.3]	0.71	NA	NA

Communication of test results (1-10)	0.12 (0.01,0.22) [0.3]	0.03	NA	NA	-0.08 (-0.29,0.13) [-0.2]	0.46	NA	NA
Timely communication of test results (1-10)	0.05 (-0.02,0.13) [0.4]	0.15	NA	NA	0.06 (-0.12,0.23) [0.4]	0.50	NA	NA
Medication reconciliation (1-10)	-0.07 (-0.18,0.04) [-0.4]	0.24	NA	NA	-0.03 (-0.23,0.17) [-0.2]	0.77	NA	NA
Patient access to visit notes, %	0.02 (0.00,0.04) [0.1]	0.10	NA	NA	0.03 (-0.01,0.06) [0.2]	0.10	NA	NA

ACO = Accountable Care Organization, NPI = national provider identifier, TIN = tax identification number, HCC = Hierarchical Condition Categories, CCW = Chronic Conditions Warehouse, NA = not applicable (multiple years of data not available in pre-intervention period)

\*Effect sizes were calculated by dividing the differential change by the standard deviation of ACO-level means. Thus, an effect size of 1 could be interpreted as moving from average performance among ACOs to approximately the 84<sup>th</sup> percentile among ACOs.

†These differential changes were adjusted for any differences in trend between the intervention and control groups over the 2010-2012 surveys. Because most questions about care coordination and management were asked only in the 2012 and 2013 surveys, no adjustment for prior trends could be made (NA).

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